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ABSTRACT

A defocused implementation of the lateral shearing interferometer in which an image-plane filter allows both phase-shifting and Fourier wavefront recovery methods to be readily used. The two wavefront recovery methods can be combined in a dual-domain technique providing suppression of noise added by self-interference of high-frequency components in the test-optic wavefront. A method of generating an interference pattern with a lateral shearing interferometer that includes the steps of: (a) directing a source of radiation toward a test optic provided in a test-optic region of the lateral shearing interferometer whereby the test optic focuses a beam of radiation to an image plane located downstream from the test optic; (b) dividing the beam of radiation into at a first output beam and a second output beam directed at different angles with respect to one another such that the first output beam impinges at a first location on the image plane and the second output beam impinges at a second location, laterally separated from the first location, on the image plane, wherein the first and second locations on the image plane onto which the first and second output beams impinge define a beam separation angle; (c) phase shifting at least one of the first output beam and the second output beam; (d) passing the first output beam through a first window on a mask that is positioned at the image plane of the test optic to produce a first wave and passing the second output beam through a second window on the mask to produce a second wave; (e) recording a set of interference patterns (interferograms), with relative phase shifting between each element of the set; (f) recovering a first shearing wavefront by processing the recorded interferograms in both temporal and spatial domains; (g) repeating steps (b) through (f) at a different beam separation angle to recover a

second shearing wavefront ; and (h) combining the first and second shearing wavefronts to recover a test-optic wavefront.

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